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ABSTRACT

Broadly conceived, social impacts refer to all changes in the structure and functioning of patterned social ordering that occur in conjunction with an environmental, technological, or social innovation or alteration. Departing from the usual cost-benefit analysis approach, a new methodology proposes conducting social impact assessment grounded in the theoretical perspective of human ecology. Empirically, the methodology uses quality of social life indicators (50 community characteristics categorized under the headings of demography, economy, social structure, public services, and social well-being) that are measured with objective data, weighted according to subjective value judgements, and combined into factor indexes. The principal benefit of this methodology is that it enables social scientists to use dynamic system modelling to predict the most likely impacts of any specified innovation. Although this methodology still requires refinement and testing, its main features can be of practical use to social researchers and planners in measuring the actual effects of ongoing programs or projects and for forecasting the likely consequences of proposed policies or developments. (NEC)

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TOWARD A METHODOLOGY FOR CONDUCTING
SOCIAL IMPACT ASSESSMENTS USING
QUALITY OF SOCIAL LIFE INDICATORS

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July 1976

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TOWARD A METHODOLOGY FOR CONDUCTING SOCIAL IMPACT ASSESSMENTS USING QUALITY OF SOCIAL LIFE INDICATORS

Marvin E. Olsen and Donna J. Merwin

1. INTRODUCTION

Considerable attention is currently being directed toward the process of social impact assessment by social scientists, social planners, and public officials. This work is severely hampered, however, by the lack of a standardized methodology. Thus far, virtually all social impact assessments have been made on an ad hoc (and often haphazard) basis, with no attempt to ground the work on any kind of theoretical foundation or to employ a methodology that could be replicated by others. Two serious consequences of this condition have been (a) the absence of any continuity among social impact assessments that would render their findings comparable or cumulative; and (b) the lack of any attempts to perform social impact research on current or completed projects to ascertain their actual social consequences. As a result, we do not at the present time have a sound empirical base from which to derive social impact assessments.

The methodological approach employed in most previous social impact assessments has been some version of cost-benefit analysis, as borrowed from economics. Although this methodology may be fully appropriate for assessing the likely economic consequences of a proposed policy or project, it is often inadequate for assessing social impacts, as noted by several writers:

(1) most social phenomena cannot be specified in monetary terms; (2) what is beneficial to one group or set of people may be detrimental to another; (3) often those who receive the benefits are not those who pay the costs; and (4) there is usually a considerable time lag between the imposition of costs and the realization of long-term benefits.⁽¹⁾ More generally, since straightforward balancing of social costs and benefits is never possible, one's evaluation of any expected social impacts is always affected by one's social values.

As expressed by Wolf:

"Social impacts may be beneficial as well as detrimental, and often both at the same time. Who decides, on what rational basis and legal authority, and which . . . values and interests are served, are questions for major consideration."(2)

Use of the cost-benefit format for social impact assessments has often resulted in environmental impact statements designed to demonstrate that the benefits to be gained from a proposed project will undoubtedly outweigh the expected costs, rather than to ascertain the full nature and extent of the probable impacts.⁽³⁾

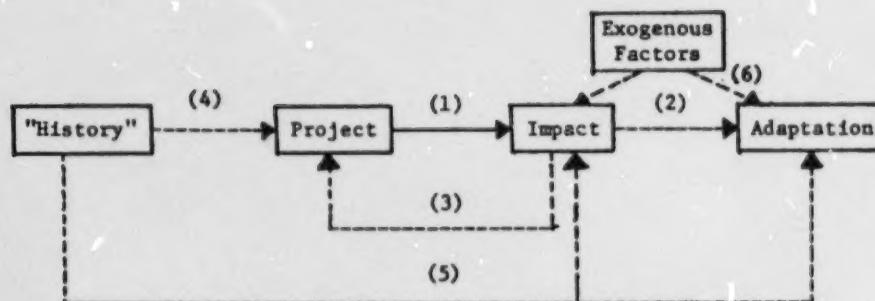
The purpose of this report is to propose a new methodology for conducting social impact assessment, which we call "Quality of Life Indicators of Social Impacts." This methodology is being developed as part of the Pacific Northwest Regional Assessment Program of the Division of Biomedical and Environmental Research of the Energy Research and Development Administration. Although this methodology still requires considerable refinement and testing, its main features can be described in enough detail to be of practical use to social researchers and planners. Conceptually, the methodology is grounded on a unifying theoretical perspective and integrated around a general analytical model. Empirically, it utilizes a wide variety of standardized quality of social life indicators that are measured with objective data, weighted according to subjective value judgments, and combined into factor indexes. The resulting methodology should be useful both for measuring the actual effects of ongoing programs or projects and for forecasting the likely consequences of proposed policies or developments.

Chapter 2 of this paper discusses the nature of social impacts, followed in Chapter 3 by a sketch of the theoretical model underlying our proposed methodology. The quality of social life indicators and factors to be measured with this approach are described and listed in Chapter 4. Chapters 5 and 6 then explain how these indicators and factors would be utilized in performing social impact research and preparing social impact forecasts.

2. SOCIAL IMPACTS

There is no standard definition of the nature or scope of social impacts. As this topic has received increasing attention in recent environmental impact statements, social impact analysis has been approached in numerous ways. Among these have been the following, all of which Peelle argues are totally inadequate: (a) creating an economic balance sheet of monetary costs and benefits, (b) collecting unevaluated demographic and related data, (c) compiling a few observations and opinions on "aesthetics," and (d) asserting in the absence of any respectable data that "no further social or land-use impacts are expected."⁽⁴⁾

Broadly conceived, social impacts refer to all changes in the structure and functioning of patterned social ordering that occur in conjunction with an environmental, technological, or social innovation or alteration. Impacts are dynamic processes, not static conditions, and must therefore be continually measured through time. They may be judged to be either desirable or undesirable in nature. And although impacts are often described as caused by prior innovations or alterations, in reality they always interact with their original causes in a reciprocal process, either immediately or after some time lag. Hence the above definition speaks of impacts as occurring in conjunction with an innovation or alteration, rather than resulting from it. For instance, the interactive process between a construction project and its impacts, as well as other related factors that must be examined in any thorough social impact analysis (SIA), has been diagrammed and described by Wolf in the following manner:



"The direct impact (1) is a deformation in the state variables describing initial conditions, but if analysis were to end there it would severely distort the reality situation of SIA. The continuing effects of readjustment and adaptive change represent a sort of "feed-forward" (2). We can further hypothesize a differential social responsiveness on the part of impacted units.* Conversely, in the planning phase the direct impact may result in a kind of "reaction formation" which impinges on project planning itself (3), in the form of public opposition and plan modification. Moreover, the project itself may be regarded as the social effect of a social cause--its "history" as a prospective solution to preexisting concerns, problems and issues residing in the affected area (4), and this history conditions public receptiveness at the points of impact and subsequent adaptation (5).** Finally, the intrusion of exogenous variables (6), whether random or systematic, compounds the problem of attributing measured effects to planned interventions."(5)

It is also important to distinguish between two forms of social impact assessment: impact research and impact forecasts. These two activities are closely interlinked, however, and the methodology proposed here is applicable to both of them.

Impact research examines current or completed projects to identify and measure the impacts they actually are or have produced. It is, in effect, the study of ongoing social change processes. Knowledge gained through such research in turn provides a factual base for making impact forecasts.

An impact forecast is a prediction of the consequences that will most likely result from a proposed policy, program, or project. Ideally, it should be based on detailed knowledge of both (a) existing social, economic, and

political conditions in the area affected, and (b) processes of social change and development. Although forecasts always involve considerable margins of error, when properly done they become vital inputs to decision-making and long-range planning.

The methodology described in this report uses quality of social life indicators to measure both predicted and actual impacts of new projects and developments of all kinds. A proposal to use social indicators to measure social impacts was recently put forth by Finsterbusch, *et al.*,⁽⁶⁾ but their "methodology for analyzing social impacts of public policies" consists only of an elaborate "relevance tree" classificatory scheme, and they have not quantified any of their suggested indicators. Several attempts have been made in recent years to construct sets of quality of life indicators,⁽⁷⁾ although most of this work has (a) lacked any sound theoretical basis, (b) involved only one-time static measurements, and (c) not been applied to social impact assessment. Consequently, there is presently an unequivocal need to develop a set of quality of social life indicators that can be incorporated into a standardized methodology for conducting social impact assessment. These indicators should be quantitative in nature (on at least an ordinal scale), they should adequately represent the real phenomena of which they are measures, and they should be accessible from existing governmental or organizational records and documents as far as possible.

3. THEORETICAL MODEL

The methodology proposed here is grounded in the theoretical perspective of human ecology. This viewpoint essentially argues that mankind is inexorably dependent on the natural environment, and that collective social life is always constrained and shaped by the basic ecological factors of natural resources, population characteristics, material and social technology, and the economic order which satisfies peoples' sustenance needs.⁽⁸⁾ To this ecological perspective we add two further assumptions: (1) Collective social activities are generally aimed at the attainment of goals which reflect the values and interests of the participants, so that social impact assessment must reflect both

the ecological conditions prevailing in a community and the values, interests, and goals of the community members. (2) A community can be viewed as a problem-solving social system, in which (a) challenges such as new environmental or technological conditions initially disrupt existing social processes and patterns of social ordering, which (b) creates temporary problem conditions and activities, which in turn (c) generate collective responses to cope with these problems, which finally (d) act back (as either positive or negative feedback) on the initial disruptive conditions.

These perspectives and assumptions are reflected in the General Social Impact Model shown in Figure 1, which provides a basic theoretical framework for our proposed social impact assessment methodology. The inputs to this model are (a) such disruptive innovations or alterations as growing resource scarcities (e.g., oil or water depletion), governmental policy decisions (e.g., emphasis on solar energy, limiting economic growth), or technological development projects (e.g., nuclear energy centers, water reservoirs); and (b) values and interests of the people in the affected area. Whatever the precise nature of the outside disruption, it can be expected to have direct and relatively immediate impacts on the basic ecological factors of the local population and economy. And since these two factors are highly interrelated, any change in one of them will likely also produce a corresponding change in the other. These direct impacts will in turn lead to numerous indirect secondary effects on the social structure and public services of the surrounding area, and may also generate a variety of social problems that affect the social well-being of the community. All of these direct and indirect impacts together may--though not inevitably--give rise to collective responses of one kind or another by the members of the impacted area. These responses will also be affected, however, by prevailing values and interests. Finally, these outputs from the overall impact process may act as feedback on the initial changes, with the effect of either sustaining or altering them.

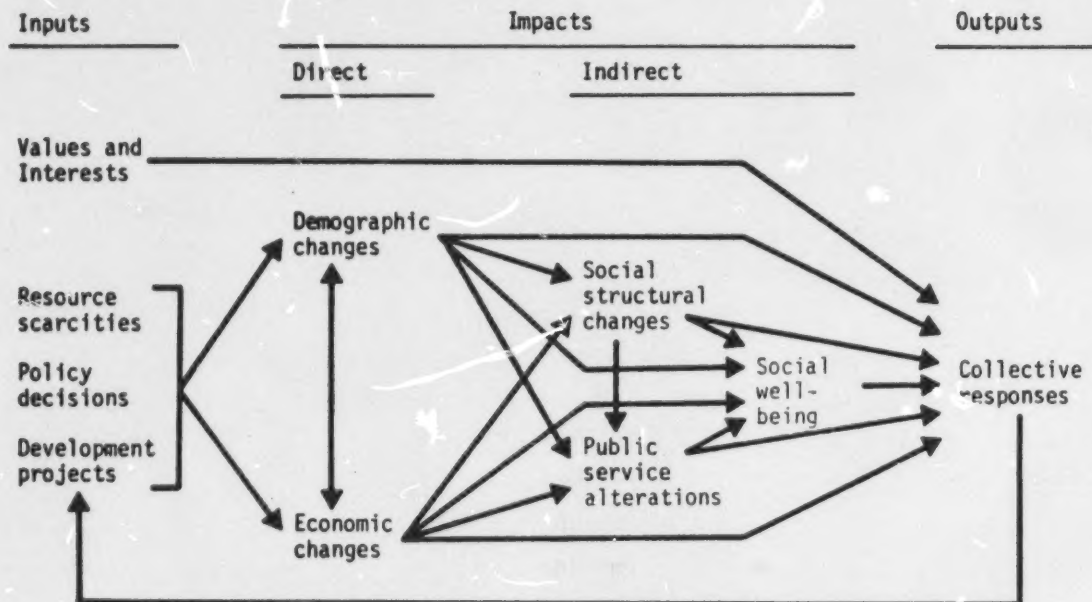


FIGURE 1. General Social Impact Model

4. QUALITY OF SOCIAL LIFE FACTORS AND INDICATORS

The General Social Impact Model provides a basic framework for integrating the social impact methodology proposed here, but it does not contain any specific quality of life factors, empirical measures of those factors, or causal linkages among them. The first step in developing this methodology, therefore, is to construct sets of factors and indicators for measuring the quality of social life.

The concept of "quality of life" has no commonly accepted meaning, beyond the vague notion of the "general welfare." In his recent review of the existing literature on quality of life indicators, Liu mentions a number of attempts to define this concept, but does not offer a precise definition of his own.⁽⁹⁾ Perhaps the best we can do, therefore, is to note that all conceptualizations of "quality of life" refer in one way or another to what people think is

important in life. In short, (a) whatever contributes to the quality of life of a population of people is ultimately determined by them, not by elites or experts of any kind, and (b) people's notion of life quality is thoroughly infused with normative values concerning what is good and right in life. Hence, there is probably no point in trying to construct a single definitive concept of "quality of life," since its meaning is highly relative and valiative.

Because the purpose of this paper is to propose a methodology for studying social impacts, we deal here with the quality of social life. We therefore exclude several other facets of the overall quality of life, including psychological perceptions of satisfactions or well-being, the condition of the natural environment, and the level of technological development. On the basis of a thorough review of the existing literature on social indicators, we identified 50 factors, or community characteristics, that are essential components of the quality of social life in the United States and other western societies. These factors would be of direct concern to policy makers in evaluating virtually any innovation. The factors are categorized under the five headings previously shown in Figure 1: demography, economy, social structure, public services, and social well-being. We also identified five kinds of collective responses that citizens, organizations, or public leaders may make to social impacts affecting their community. These responses, labeled as "impact outputs" in Figure 1, represent efforts to maintain or improve the quality of social life in a community. In addition, in any actual impact research or forecast it will also be necessary to collect data on the nature of the initial innovation or alteration, prevailing public values and interests, and other exogenous variables, but these are not conceptualized as quality of social life indicators or responses.

Each quality of social life factor and collective response is measured with an index composed of one or more (preferably two or three) empirical indicators. The index for the factor of "residential stability," for instance, is composed of these two indicators: (a) mean length of occupancy of all dwelling units in the community, and (b) the proportion of all dwelling units that are owner-occupied. An index score for a particular quality of social life factor or

collective response in a particular community at a particular point in time is constructed by transforming the observed value of each of its component indicators into a standardized score that expresses the degree to which that indicator approaches its preferred value, and then computing the mean of these standardized indicator scores. The preferred value for each indicator may be specified either by a set of qualified experts (e.g., the ideal ratio of 0.80 primary care physicians per 1000 population established by the American Medical Association), or by the public as a whole (e.g., a sex ratio of 1.0). With many of these indicators, the preferred value is simply as high or low a figure as possible, as illustrated by educational expenditures per child or number of violent crimes per capita. In a number of these cases there is an upper or lower limit beyond which further increases or decreases would be meaningless--such as one television channel for every 100 people or one policeman for every three citizens. In practice this is not a serious problem, however, since rarely (if ever) are these limits approached in real life. We are presently in the process of obtaining these preferred values for each indicator.

More specifically, the standard scores are computed with the following formula:

$$SS = 1 - \left| \frac{OV - PV}{PV} \right|$$

where SS = standard score for an indicator, OV = observed value for that indicator, PV = preferred value for that indicator, and the absolute value of this ratio is utilized. The resulting standard scores have a maximum possible value of 1.00 when the observed value equals the preferred value. In most cases the minimum possible value of a standard score is 0, but if the observed value can be a negative number (as in the case of a negative growth rate), then the resulting standard score could be any negative number. The index score for a quality of social life factor or collective response is then the mean of all its indicator standard scores. This index construction procedure can be illustrated by continuing the above example of residential stability. A hypothetical index score for this factor might be computed for community Z at time T as shown below:

	<u>Observed value</u>	<u>Preferred value</u>	<u>Standard score</u>
Mean occupancy length	15 years	10 years	0.50
Units owner-occupied	50%	60%	0.83
Index score			0.665

Appendix A lists these 55 quality of social life factors and collective responses, arranged into the previously mentioned six broad categories. All of the items are stated in implicitly or explicitly positive terms. For instance, the term "residential stability" implies that greater stability contributes positively to the quality of life in a community. In other cases, such as "lack of crime," the positive nature of the term is quite explicit.

Under each item in the appendix is listed one or more empirical indicators to be used in measuring it. These indicators are stated in terms of both their quantitative measurement and their qualitative contribution to the quality of social life. Some of these qualitative evaluations--such as the assumptions that high educational attainment or low infant mortality contribute to the quality of social life--would undoubtedly be accepted by most people. Other evaluations--such as associating length of residential occupancy with quality of social life--are open to considerable debate, and will likely vary from one community to another according to prevailing social values. Hence the qualitative evaluations attached to the indicators should be considered only provisional, to be altered later as necessary to reflect the values of specific communities. For the present, all the indicators of a given factor are weighted equally, although eventually it may become desirable to weight them differentially. This listing of indicators in the appendix should therefore not be taken as definitive, but merely as an illustration of the kinds of data that can be used to measure each quality of social life factor.

Virtually all previous efforts to measure the quality of social life have assigned equal weights to all the component factors and then simply added the factor scores together to obtain one or more composite scores. This procedure in effect assumes that all factors are equally important in contributing to the quality of social life. That assumption is highly questionable, however.

We shall therefore assign different weights to the various factors, according to their perceived importance for the quality of social life. These weightings will be derived from subjective judgments obtained from a variety of respondents, including (a) citizens within different demographic and social categories (e.g., males and females; young, middle-aged, and old; black and white; blue-collar and white-collar workers; poor, middle-income, and rich; elementary, high school, and college graduates); (b) various kinds of professionals (e.g., planners, social workers, social scientists), and (c) community leaders (e.g., public officials, business elites, organizational leaders).

We are presently in the process of obtaining these subjective evaluations and assigning weightings to the quality of social life factors. Tentatively, these factor weightings will range from -5 (strongly negative) through 0 (irrelevant) to +5 (strongly positive). Each factor score will be multiplied by its weighting before being combined with other factor scores to form overall quality of social life assessments. For example, if residential stability were weighted "3," its index score of 0.665 computed above for community Z would become 2.0. This residential stability factor score could either be reported by itself or else combined with the weighted scores for all the other social structural factors to obtain an overall score for that category.

5. SOCIAL IMPACT RESEARCH

The purpose of developing indicators of the quality of social life is to provide standardized measures of social change--in this case, impacts caused by a new policy or project. Before we can predict with any accuracy the likely impacts of a proposed innovation, however, we must thoroughly study past and current change processes to determine what kinds of effects do in fact result from various kinds of new policies and projects. That is, we must conduct extensive social impact research utilizing our quality of social life indicators. Where the necessary information is already available, we can do this research on past events or utilize the results of previous research studies. Since the concept of social indicators is relatively new, however, much of the currently existing social science literature is not directly relevant to this

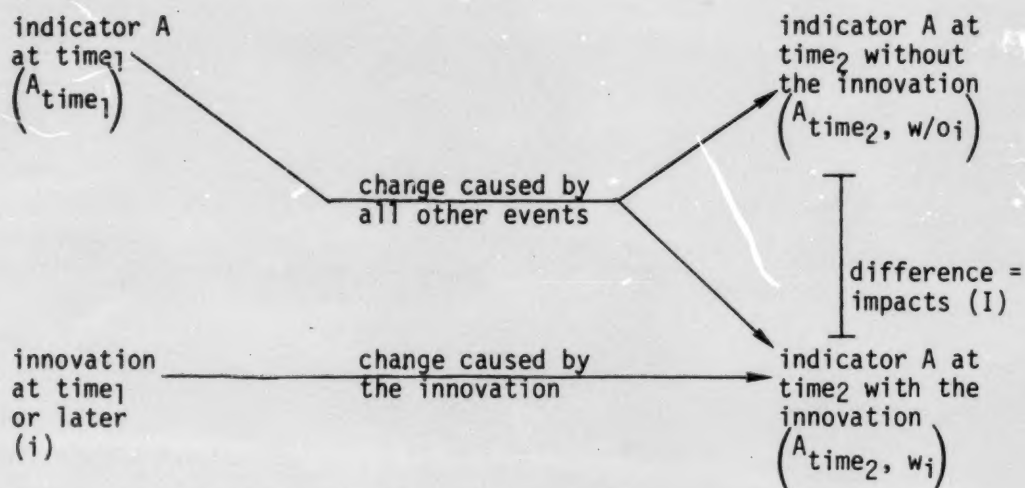
task. Hence there is a pressing need for numerous studies of ongoing programs and projects to determine how they are actually affecting the quality of social life in surrounding areas.

Although the geographical size of the area affected by any particular innovation will be heavily influenced by its nature and scope, most social impacts are generally experienced within the community or communities closest to where the innovation occurs. And even though a large project or broad new program might have discernable impacts throughout a region or even the total society, most of these effects are nevertheless experienced most intensely in the immediately surrounding area. We propose, therefore, that as a general rule social impact research should take the community as the basic unit of analysis. In urban areas, community boundaries will likely coincide with either the total urban place or the encompassing county. In rural areas, the functioning community may consist of two or more towns that are relatively close in location and economically interdependent. In addition, some social indicators pertain to the whole county in which the community is located.

The basic purpose of social impact research is to determine how much change occurs in each social indicator (and hence each factor index) between time₁ (before the innovation) and time₂ (after the innovation), and perhaps also at subsequent intervals of time₃, time₄, etc. In other words, amount of social change on variable A = value of indicator A at time₂ - value of indicator A at time₁, or:

$$\Delta A = A_{\text{time}_2} - A_{\text{time}_1}$$

In addition, however, we want to determine how much of that observed change is actually caused (either directly or indirectly) by the particular innovation under investigation, as opposed to all other events and social trends occurring in the community. Hence our ideal social impact research model would be as follows:



In this model, the magnitude of the impacts resulting from the innovation under investigation is determined by comparing the value of each indicator (such as A) at time₂ with what that value would have been at that time had the innovation not occurred. In short:

$$I = \left(A_{\text{time}_2, w_i} \right) - \left(A_{\text{time}_2, w/o_i} \right)$$

The main difficulty with this model, obviously, is estimating the hypothetical value of A_{time_2} without the effects of the innovation. There are three ways of estimating this figure, all of which provide at best only crude approximations: (1) If a time trend can be established for variable A during the years preceding time₁, this trend (whether it be linear, curvilinear, exponential, etc.) can be extrapolated to time₂ with fair accuracy, especially if the time period involved is not too great. (2) The community or county being studied can be matched (on as many variables as possible) with another community or county not experiencing the innovation, and the value for indicator A at time₂ in the control community or county taken as an estimate of $A_{\text{time}_2, w/o_i}$ in the area being studied. (3) The national mean (or median) for A_{time_2} can be applied to the community or county under investigation as an estimate of $A_{\text{time}_2, w/o_i}$ in that area.

The procedure described above is particularly relevant to the two categories of direct impacts--demographic changes and economic changes--which are closely linked to the innovation being studied. The researcher has more methodological flexibility, however, with the three categories of indirect impacts--social structural changes, public service alterations, and social well-being--as well as with collective response outputs. The causal linkages from demographic and economic changes to these latter sets of factors, and also among these sets, can be examined apart from any policy or project innovations. As one example, the effects of rising socio-economic status on the quality of medical care or the crime rate can be studied in almost any community. In point of fact, these kinds of relationships have long been a central concern of sociological research, although our knowledge of most of these relationships is still extremely limited and fragmentary.

The fundamental purpose of social impact research is to determine the patterns, directions, strengths, and lags of the causal relationships existing among all the variables relevant to one's concern. That is, we need to determine--usually in the following order of increasing methodological sophistication--(a) which variables are related to which other variables, (b) the causal directions of these relationships (both recursive and nonrecursive), (c) regression coefficients for the strengths of these relationships, and (d) any temporal lag effects that occur in this causal process. Although much social science research is still dealing with the first of these tasks, and only recently has any significant headway been made on the second and third tasks, these limitations can at least temporarily be circumvented by specifying hypothetical patterns of causal relationships in one's theoretical model, and then asking the question: If these hypothetical sets of causal relationships did in fact exist, what kinds of impacts would a particular innovation have on the quality of social life in this community?

6. SOCIAL IMPACT FORECASTS

The ultimate goal of this entire process of social impact assessment is to improve our ability to predict the likely impacts of any anticipated or

proposed new policy, program, or project. Thus far, the usual way of making these forecasts has been merely to project (usually on a linear basis) whatever trends were known to be occurring, and then to add onto them the expected (or guessed or estimated) effects of the innovation. In terms of the methodological model sketched in the previous section, both $A_{\text{time}_2, \text{w/o}_i}$ and $A_{\text{time}_2, \text{w}_i}$ have been at best crude estimates with little or no basis in empirical knowledge. Moreover, this current practice does not take into account the ways in which one impact may affect others throughout the entire social system. Several methods, such as cross-impact forecasting,⁽¹⁰⁾ have been developed to identify these interrelated indirect impacts, but they rely heavily on subjective judgments by presumed experts.

The principal benefit of our proposed social indicator methodology, in contrast, is that when fully developed it will enable social scientists to use dynamic system modelling to predict the most likely impacts of any specified innovation. Once we can measure--at least crudely--the causal effects of each variable in the system upon every variable, it becomes possible, using a computer, to identify all the impacts likely to result from a specified alteration in any one part of that system. Although such dynamic system modelling can never perfectly predict the future--since it cannot take into account unforeseen future events that may change the system in other ways--it nevertheless can greatly improve our ability to forecast future social impacts of all anticipated and proposed innovations. Moreover, the "collective problem solving" theoretical perspective underlying this methodology focuses attention on the ways in which affected communities will likely respond to the impacts of an innovation in a feedback process.

To perform dynamic systems analysis, one must first design a system model to represent the total process being investigated (or at least its most important components). The "Process Model of Social Impacts of Development Projects" shown in Figure 2, which depicts the general process through which a major construction project might affect the local surrounding area, is a simplified illustration of the kind of detailed system model that would be constructed for this purpose. When applied to an actual situation, the model would be elaborated to include relevant unique features of that situation, as well as observed

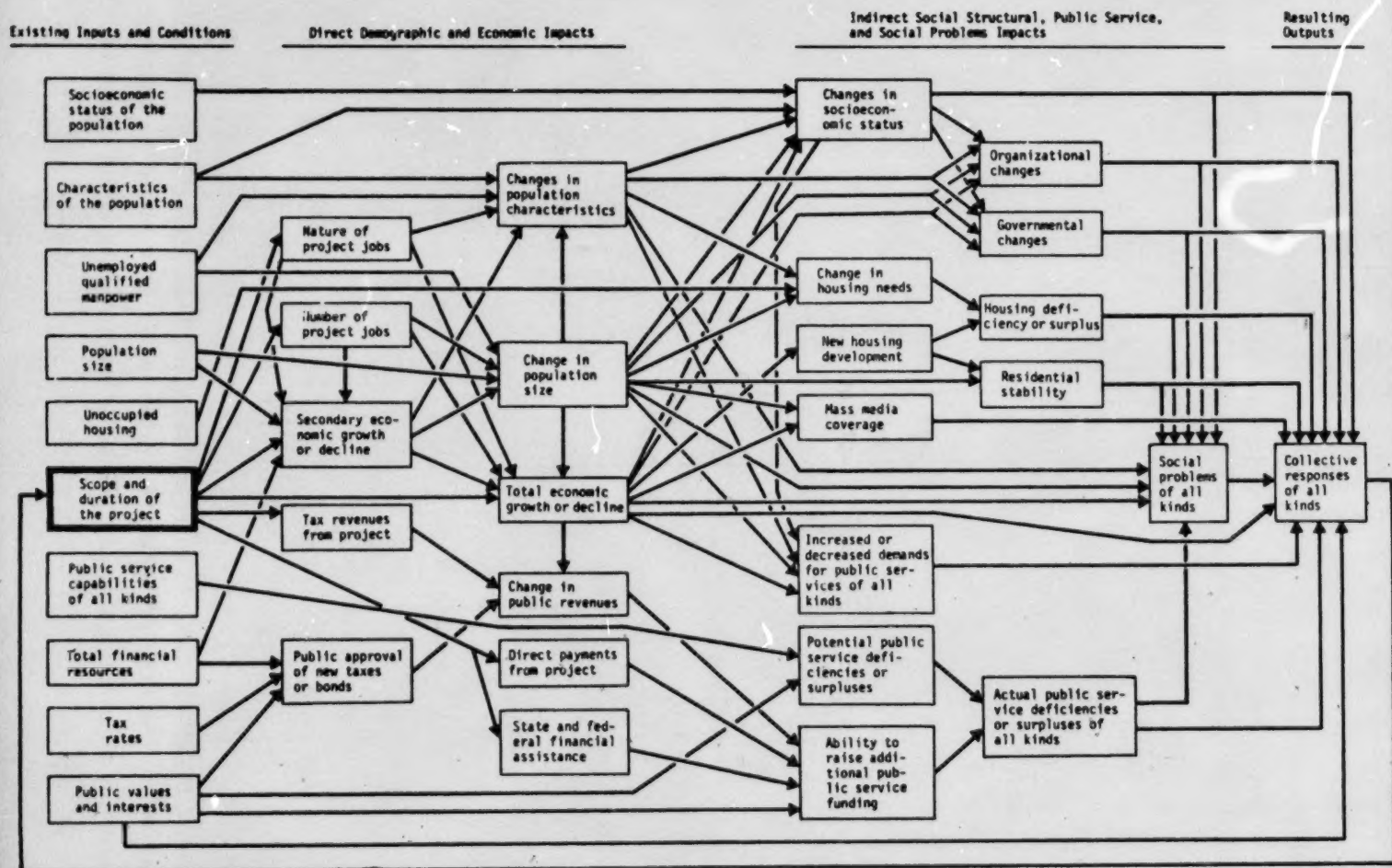


FIGURE 2. Process Model of Social Impacts of Development Projects

measurements of all variables, regression coefficients for connecting paths among the variables, and additional feedback loops. In general, however, this illustrative model could be applied to most innovations with only minor modifications. Dynamic system models such as this will provide a means for predicting with considerable accuracy the most probable consequences that would result from any proposed development project or other innovation.

The model in Figure 2 begins with the scope and duration of the construction project, plus a number of conditions already existing in the affected area, including the size, socio-economic status distribution, and other characteristics of the population; the availability of unemployed qualified manpower; the extent of unoccupied housing; existing public service capabilities of all kinds; current tax rates and total financial resources of the area; and prevailing public values and interests. Some of the more significant direct demographic and economic impacts of the project would include the number and nature of jobs provided by the project, as well as secondary economic growth in the area generated by the project; the resulting total population growth and changes in various population characteristics; the resulting overall economic growth produced by the project; the willingness of the public to approve new taxes or bonds to fund expanded public services and the resulting increase in public revenues; and other sources of additional revenues such as taxes paid by the project or governmental assistance.

Included under the heading of indirect social structural, public service, and social well-being impacts are a wide variety of potential social consequences of the construction project. Social structural factors include changes in the occupational, educational, and income distributions of the affected populations, housing deficiencies and residential stability; changes in the number of voluntary associations such as civic or occupational organizations, as well as rates of involvement in them; changes in both political participation and the size and scope of local government; and changes in the extent of mass media coverage. Additional demands for, or recognized deficiencies in, public services might involve education, medical care, public health, public transportation, police and fire protection, legal services, social services, recreation, or cultural

facilities. The list of social problems that might be aggravated or otherwise influenced by social changes resulting from the project is virtually limitless, but could include crime and juvenile delinquency, physical and mental illness, alcohol and drug abuse, racial and sexual discrimination, family disruption, unemployment and poverty, inadequate housing, and collective violence.

The collective responses that might be stimulated by any of the preceding conditions could take the form of actions by civic or special interest organizations; all kinds of political efforts by individuals or groups or parties; initiation or expansion of governmental programs of all kinds; and increased attempts at comprehensive community planning.

As elaborate system models are designed, quantified, and analyzed, they will provide extensive sets of data on which to base forecasts of likely future impacts, as well as knowledge about the process through which these changes occur as they spread throughout an entire social system. This factual knowledge will not, however, provide answers to the ultimate valiative question that policy makers must eventually face: Will this anticipated or proposed innovation contribute to or detract from the quality of social life? When making these basic valiative decisions, policy makers must take into account the amount of change likely to result from the innovation, its specific nature, the rate at which this change will occur, and the overall configuration of conditions that will probably exist after these changes have transpired. With this information in hand, they must then evaluate the overall social value of the innovation and decide whether or not to instigate it.

A unique feature of our proposed use of quality of social life indicators to measure social impacts, however, is that the evaluation process is broken down into many relatively small and manageable segments. Whereas the usual procedure in the past has been to collect all relevant data in a value-neutral manner and then attempt to make a single overall value judgment that hopefully considered all this information at once, our proposed procedure places much of this evaluative process in the initial stage of specifying empirical indicators. For each indicator, the researcher using this method must ascertain which possible trends will contribute to the quality of social life and which

will detract from it in that situation. These judgments will also be quite subjective in nature, but since each one pertains only to a fairly small and delineated facet of life, each one can be discussed and defined with considerably more rationality than can a single global subjective judgment. A final evaluative decision must still be made by policy makers, but the base of knowledge on which their decision rests will be considerably deeper and richer with our proposed quality of social life approach to social impact assessment. An adequate knowledge base does not ensure wise decisions, but without it all decisions are capricious. Hopefully, therefore, our proposed social impact methodology will help improve the quality of future policy decisions in many realms of contemporary society.

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APPENDIX A

QUALITY OF SOCIAL LIFE FACTORS AND INDICATORS

A. Demography

1. Population size of the community
 - a. Number of inhabitants
+ = positive relationship up to 500,000;
negative above that*
2. Amount of population growth in the community
 - a. Annual amount of growth through natural increase during the past 10 years
+ = cannot be specified at the present time
 - b. Annual amount of growth through net migration during the past 10 years
+ = cannot be specified at the present time
3. Rate of population growth in the community
 - a. Annual percentage rate of growth during the past 10 years
+ = the closer to 1%
4. Degree of urbanization of the county
 - a. Proportion of population in cities of 20,000 or more
+ = the closer to 60-75%
5. Population density of the county
 - a. Number of persons per square mile
+ = the closer to 100
6. Population concentration of the county
 - a. Proportion of the total population in the largest urban place
+ = the closer to 20-50%

* + for each indicator specifies that condition we provisionally judge to be most favorable for the quality of social life.

7. Age dependency in the community

- a. Proportion of the population under 18 and over 65
+ = the smaller the proportion

8. Sex ratio of the community

- a. Ratio of males to females
+ = closer to 1.0

9. Ethnic composition of the community

- a. Percent of the population nonwhite
+ = the closer to 13%

10. Family size in the community

- a. Number of persons per household
+ = the closer to 2.0

B. Economy

1. Job opportunities

- a. Proportion of available unskilled jobs that are vacant
+ = higher proportion
- b. Proportion of available semi-skilled jobs that are vacant
+ = higher proportion
- c. Proportion of available skilled jobs that are vacant
+ = higher proportion
- d. Proportion of available clerical/sales jobs that are vacant
+ = higher proportion
- e. Proportion of available managerial jobs that are vacant
+ = higher proportion
- f. Proportion of available professional jobs that are vacant
+ = higher proportion

2. Job distribution

- a. Proportion of available jobs that are unskilled
+ = lower proportion
- b. Proportion of available jobs that are semiskilled
+ = lower proportion
- c. Proportion of available jobs that are skilled
+ = higher proportion
- d. Proportion of available jobs that are clerical/sales
+ = lower proportion
- e. Proportion of available jobs that are managerial
+ = higher proportion
- f. Proportion of available jobs that are professional
+ = higher proportion

3. Gross county product size

- a. Gross county income per year
+ = greater amount

4. Gross county product growth

- a. Annual percentage rate of growth in gross county income during past 10 years
+ = higher rate

5. Employment level

- a. Proportion of the labor force that is employed
+ = greater the proportion

6. Participation in the labor force

- a. Proportion of women in the labor force
+ = greater the proportion
- b. Proportion of persons age 65 or older in the labor force
+ = greater the proportion

7. Property tax base

- a. Total value of assessed real property
+ = higher amount
- b. Total value of assessed personal property
+ = higher amount

8. Financial inflow from federal government

- a. Amount of federal revenue sharing funds received per year
+ = greater amount
- b. Amount of direct federal aid to impacted areas received per year
+ = greater amount
- c. Amount of other federal monies received per year
+ = greater amount

9. Price level

- a. Consumer price index for the community
+ = lower the index

10. Public revenues

- a. Total revenues collected by all community governmental units in past year
+ = greater amount

C. Social Structure

1. Educational attainment

- a. Median educational attainment of persons age 25 or older
+ = high attainment

2. Socioeconomic status

- a. Mean occupational status of the work force
+ = high status
- b. Median gross family income
+ = high income

3. Housing availability

- a. Number of unoccupied dwelling units per 1000 population
+ = greater number

4. Housing space

- a. Mean dwelling unit size (sq. ft.) per person
+ = greater space
- b. Proportion of dwelling units that are single-family detached
+ = high proportion

5. Residential stability

- a. Mean length of occupancy of all dwelling units
+ = greater length
- b. Proportion of all dwelling units that are owner occupied
+ = higher proportion

6. Mass media coverage

- a. Combined circulation per capita of all local newspapers
+ = high circulation
- b. Number of television channels in the area
+ = greater number

7. Civic association extensiveness (e.g., business, professional, fraternal, service, educational, ethnic, and political associations)

- a. Number of associations per 1000 population
+ = greater number

8. Civic association participation

- a. Total memberships per capita in all such associations
+ = higher number

9. Political participation

- a. Proportion of eligible persons who are registered
+ = higher proportion
- b. Turnout rate in local elections during previous year
+ = higher rate

10. Local government size

- a. Total number of community governmental employees per 1000 population
+ = higher number
- b. Total program budget of all community governmental units per capita
+ = greater amount

D. Public Services

1. Public education

- a. Mean class size (students per classroom)
+ = low number
- b. Mean student-teacher ratio
+ = low ratio
- c. Mean educational level of teachers
+ = high level
- d. Total educational expenditures per student per year
+ = greater amount

2. Medical care

- a. Hospital beds per 1000 population
+ = greater number
- b. Total hospital expenditures per capita per year
+ = greater amount
- c. Number of mental health clinics per 1000 population
+ = greater number
- d. Number of physicians per 1000 population
+ = greater number
- e. Number of dentists per 1000 population
+ = greater number
- f. Number of psychiatrists and clinical psychologists per 1000 population
+ = greater number

3. Public health

- a. Total local governmental expenditures on public health per capita per year.
+ = greater amount
- b. Number of public health workers (excluding sanitation) per 1000 population
+ = greater number
- c. Number of sanitation employees per 1000 population
+ = greater number

4. Fire protection

- a. Number of fire employees per 1000 population
+ = greater number
- b. Total local government expenditures on fire protection per capita
+ = greater amount
- c. Fire protection classification of the community
+ = higher the classification

5. Police protection

- a. Number of police employees per 1000 population
+ = greater number
- b. Total local government expenditures on police protection per capita
+ = higher proportion
- c. Proportion of all cases cleared by arrest
+ = higher proportion

6. Public transportation

- a. Total expenditures for public transportation of all kinds per capita per year
+ = greater amount
- b. Number of miles of scheduled bus routes per capita
+ = greater number
- c. Number of buses per capita
+ = greater number

- d. Total expenditures for street maintenance per capita per year
+ = greater amount

7. Legal services

- a. Number of attorneys per 1000 population
+ = greater number
- b. Total budgets of legal services centers per capita
+ = greater amount
- c. Median months to trial in criminal cases
+ = lower number
- d. Median months to trial in civil cases
+ = lower number

8. Social services

- a. Total number of professionals in all social service agencies per 1000 population
+ = greater number
- b. Total budgets of all social service agencies per capita per year
+ = greater amount
- c. Number of social service agencies per 1000 population
+ = larger number

9. Recreational facilities

- a. Number of movie theaters per 1000 population
+ = greater number
- b. Acres of public parks per 1000 population
+ = greater number
- c. Total governmental expenditures for parks and recreational facilities per capita per year
+ = greater amount
- d. Total governmental expenditures for recreational programs and activities per capita per year
+ = greater amount

10. Cultural facilities

- a. Number of books in municipal public library per 1000 population
+ = greater number

- b. Total budgets of all major museums per capita per year
+ = greater amount
- c. Number of publicly sponsored cultural courses per 1000 population per year
+ = greater number

E. Social Well-Being

1. Lack of crime and delinquency

- a. Number of violent crimes per 1000 population per year
+ = low number
- b. Number of property crimes per 1000 population per year
+ = low number
- c. Number of serious delinquency violations per 1000 population per year
+ = low number

2. Lack of alcohol and drug abuse

- a. Number of people treated for alcoholism or drug abuse by hospitals per 1000 population per year
+ = low number
- b. Number of contacts made with alcohol and drug abuse programs per 1000 population per year
+ = low number

3. Lack of physical and mental illness

- a. Hospitalization rate for physical or mental illness per 1000 population per year
+ = low number
- b. Number of disability days per year per capita
+ = low number
- c. Suicide rate per 1000 population per year
+ = low number

4. Lack of racial or sexual discrimination

- a. Ratio of black to white unemployment rates
+ = 1.0 ratio

- b. Ratio of black to white family income
+ = 1.0 ratio
 - c. Ratio of female to male unemployment rates
+ = 1.0 ratio
 - d. Ratio of female to male income
+ = 1.0 ratio
5. Lack of family disruption
- a. Number of divorces filed for per 1000 population per year
+ = low number
 - b. Proportion of all families with only one adult
+ = low number
6. Lack of educational difficulties
- a. Rate of school dropouts per 1000 students per year
+ = low rate
 - b. Mean score of all students on national achievement tests, compared to national averages
+ = ratio of 1.0 or higher
 - c. Functional illiteracy (less than 5 years of education) rate per 1000 population
+ = low rate
7. Lack of employment difficulties
- a. Gross labor turnover rate per year
+ = low rate
 - b. Proportion of unemployment compensation recipients exceeding maximum benefits
+ = low proportion
8. Lack of poverty
- a. Proportion of all families below the official poverty line
+ = low proportion
 - b. Proportion of all families receiving public welfare
+ = low proportion

9. Lack of substandard housing

- a. Proportion of housing units classified as dilapidated
+ = low proportion
- b. Proportion of housing units without plumbing
+ = low proportion

10. Lack of public violence

- a. Number of riots or similar events per year
+ = low number
- b. Number of deaths and serious injuries due to riots or similar events per 1000 population per year
+ = low number
- c. Amount of property damage due to riots or similar events per capita per year
+ = low amount

F. Collective Responses (directly or indirectly related to the event being investigated)

1. Public issues

- a. Number of public issues that receive extensive mass media attention per year
+ = greater number
- b. Number of public interest lawsuits filed per 1000 population per year
+ = greater number
- c. Number of appeals to governmental decisions per 1000 population per year
+ = greater number

2. Organizational activities

- a. Number of organizations making public statements on issues or problems per 1000 population per year
+ = greater number
- b. Amount of financial contributions by organizations to programs or other activities per capita per year
+ = greater amount

- c. Number of programs or other activities initiated by organizations per 1000 population per year
+ = greater number

3. Political activities

- a. Number of petitions and initiatives filed per 1000 population per year
+ = greater number
- b. Number of political movements or ad hoc political groups created per 1000 population per year
+ = greater number
- c. Number of political protests and demonstrations per year
+ = greater number

4. Governmental programs

- a. Number of new governmental programs or activities initiated per 1000 population per year
+ = greater number
- b. Number of existing governmental programs or activities expanded per 1000 population per year
+ = greater number
- c. Amount of increased expenditures for new or expanded governmental programs or activities per capita per year
+ = greater amount

5. Community planning

- a. Existence of a planning department in the local government
+ = yes
- b. Number of employees in local planning department per 1000 population
+ = greater number
- c. Total budget of local planning department per capita per year
+ = greater amount

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